





Protecting Quabbin from Aquatic Invasive Species



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Introduction

Due to the discovery of Zebra mussels in Laurel Lake in Lee, MA (June 29, 2009), and the threat of an infestation of this and other invasive species at Quabbin Reservoir, the Reservoir boating program was closed to private boats on July 16, 2009. Subsequently DCR and MWRA researched paths of transmission for aquatic invasive species, as well as other water suppliers' boat inspection programs that are implemented to protect water quality, fish and other natural resources.

Two very well attended meetings of the Quabbin Watershed Advisory Committee (QWAC) were held on July 27 and July 30, 2009, and a potential course of action to protect Quabbin while allowing private boats was proposed and discussed. DCR/MWRA proposed using the Special Olympics August Fishing Tournament as a pilot to develop and test an education, inspection, decontamination, and sealing (chain of custody system) program.

On August 4 and 5, 2009, DCR/MWRA inspected, decontaminated, and sealed 21 boats at the Mass Highway facility in Belchertown, MA. No invasive species were identified during the inspection and all boats were decontaminated with a high temperature wash, then sealed with a special plastic tag between the boat and the trailer. The plastic seal is to ensure that any boat decontaminated would not be utilized anywhere else but Quabbin. If the seal were to be broken, the boat would be required to be decontaminated again prior to use on Quabbin. DCR/MWRA staff completed the inspection and decontamination of these 21 boats in a total of six hours.

On August 8, 2009, the Special Olympics event was held. All 21 boats that were involved in the pilot program had their plastic seals intact and were allowed access to the Reservoir.

In addition, an underwater camera performed an inspection of Shaft 12 (the intake structure for Quabbin water transferring east to the Wachusett Reservoir) and divers performed an inspection of the boat ramp areas. No zebra mussels were found.

Discussion

The need for an effective management approach to prevent the spread of Aquatic Invasive Species (AIS) in Quabbin Reservoir was underscored with the discovery of zebra mussels in Laurel Lake. DCR-Watershed/MWRA considers all AIS a significant potential threat to water quality, as well as fish and other natural resources. Specifically, this event highlighted the need to develop procedures to better protect the Quabbin Reservoir from all AIS potentially introduced by the current private boat fishing program. Further, the media attention served as an opportunity to implement a general and specific public education strategy. The pilot inspection, decontamination, and sealing program is the beginning of a larger DCR effort that will encompass a system-wide evaluation of potential aquatic invasive organisms and methods to control or prevent their introduction into DCR tributaries and reservoirs.

Underwater Camera and Diver Inspections

On June 20, 2009 a Navy Reserve crew performed an inspection, utilizing an underwater camera, of the outside of Shaft 12 (the intake structure for Quabbin water transferring east to the Wachusett Reservoir). No zebra mussels were found. DCR Aquatic Biologists and divers also inspected all ramps, all concrete anchors, all cables and mooring lines at each of the three boat lunch areas. At Boat Launch Area 1, the rocky ledge around Gate 8 Island was inspected; Boat Launch Areas 2 and 3 have concrete horseshoe shaped dams that were also inspected. Mid-reservoir, south of Boat Launch Area 2 at a relatively shallow area and submerged historical bridge abutments at Boat Launch Area 3 were also inspected. No zebra mussels were found.

Special Sampling

A DCR Aquatic Biologist has also been conducting net sampling for Zooplankton since April 2009. Each sample is assayed by microscope and zebra mussel larvae has been specifically targeted for identification since they were first discovered in Laurel Lake. Twice each month at the CVA and Shaft 12 intakes and once per month at the three fishing areas net sampling was conducted. All results to date have been negative for the

presence of zebra mussel larvae and spiny water flea. Net sampling by the CVA and Shaft 12 intake and the boat ramps will become part of the regular sampling routine.

Additional water sampling was also performed to verify pH, hardness and calcium levels (limiting factors for zebra mussel growth) in Quabbin water.

Pilot Private Boat Aquatic Invasive Species Protection Program

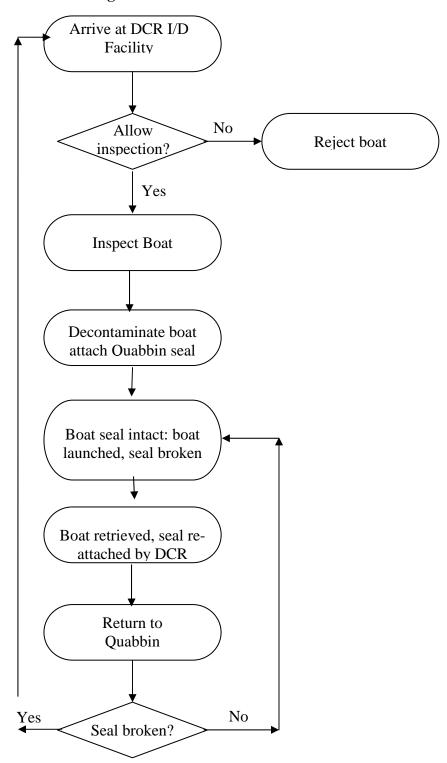
The Pilot Private Boat AIS Protection Program is summarized below. Details of each step are described in following sections. Before boats were allowed to launch on Quabbin, the owners transported their boats to a DCR Inspection Decontamination Facility (for the pilot program, the Mass. Highway Facility in Belchertown, MA was utilized). At this location boats and trailers were thoroughly inspected by a DCR Aquatic Biologist. The inspections did not find any evidence of any invasive species.

After inspection, MWRA personnel operating high temperature power washers under the direction of the Aquatic Biologist performed the "wanding" of each boat, sanitizing the external hull, internal areas including bait and live tanks onboard, outboard motors and trailers. The high temperature power wash duration varied by the size and complexity of the boats from approximately 10 minutes to 20 minutes.

Once decontaminated, DCR staff sealed the boat to the trailer. The boat was then allowed to be launched on Quabbin for the Special Olympics event, if the seal was intact.

A total of 21 boats were inspected, decontaminated and sealed on August 4th and 5th. None of these 21 boats had their seals broken upon inspection at the Quabbin Reservoir on August 8th, and all were allowed to launch their boats for the Special Olympics Event. Boats leaving Quabbin were resealed by DCR staff at the boat launch area.

The procedure is illustrated in **Figure 1**.



Methodology

On August 4 and 5, 2009, DCR and MWRA staff, under the direction of a DCR Aquatic Biologist, inspected and decontaminated 21 fishing boats. This process included an interview, an explanation of the threat of AIS and information on control measures, completions of a survey of each boat owner, an inspection and decontamination with a seal of each boat. A boat would be rejected if AIS were present or if dirt and/or debris interfered with inspection or washing. A boat would also be rejected if the motor did not start (so it could be flushed) or if a procedure to clean a compartment could not be agreed to by the owner and DCR.



Photo: 1 DCR staff interviewing a boat owner

Intake/Check-in

Determine order of inspection. Request owner's permission to inspect and decontaminate boat.



Photo: 2 Boats lined up for IED at Mass Highway facility



Photo: 3 DCR staff collecting information and conducting survey of private boat owners

Interview

A survey was conducted by DCR staff to interview boat owners (**Appendix**). Input was recorded.

Inspection

A thorough inspection of each boat and trailer for the presence of water, debris, mussels, and plant and animal growth was performed. The inspection was performed by DCR staff, under the direction of a DCR Aquatic Biologist, getting into each boat and observing and feeling for moisture and dirt by hand. Mirrors and flashlights were used for hard-to-inspect areas. A comprehensive inspection, decontamination, and sealing checklist was followed during each boat inspection.



Photo: 4 Mirror used to check underneath boat and trailers for debris



Photo: 5 DCR Aquatic Biologist and boat owner checking compartments

Decontamination and Sealing

After inspection, the boats were cleaned by MWRA staff under the direction of a DCR Aquatic Biologist, using the inspection, decontamination, and sealing checklist. MWRA staff used high-temperature pressure washer/steam cleaning equipment with multiple-use fittings and nozzles to clean the boats and trailers. The unit was tested to assure it maintained a minimum temperature of 140° Fahrenheit (F). The 140° F temperature for decontamination is based upon scientific literature and other programs across the country. Decontamination by high temperature without an additional drying period is a proven method.



Photo: 6 Pressure washer used to steam clean and flush boat



Photo: 7 Checking steam cleaner's temperature

All boat hulls and trailers were steam cleaned with special attention paid to carpeted bunkers, motors, props, transducers and any object on the hull that could transport debris.



Photo: 8 MWRA staff cleaning boat bunker while DCR Aquatic Biologist observes



Photo: 9 DCR staff washing propeller

If the bilge was clean and dry it wasn't washed, but if any water or debris was found it was sanitized with hot water (140° F).

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Photo: 10 DCR staff flushing a bilge

If the live well was clean and dry it wasn't washed, but if any water or debris was found it was rinsed with hot water (140° F). Particular care was given to cleaning live wells so that the water supply pump and tubing and drain tubing was flushed. This usually took two separate operations.



Photo: 11 Flushing live well supply lines

If the motor was in the down position and clean and dry, it was not flushed. If any water drained out or if debris was found, it was flushed with hot water (140° F). After some research, it was determined that all motors will be flushed for 5 minutes.



Photo: 12 Boat owner observes his motor being flushed

A final checklist was completed for each boat to make sure all areas were inspected and decontaminated. (Appendix).

Sealing of Cleaned Boats

Once the inspection and documentation processes were completed, a special plastic seal was attached between the boat and trailer. Boat owners were informed that tampering with the seal would result in a permanent ban from Quabbin. Each seal had a unique serial number. The serial number on the seal was recorded on the Boat Inspection Checklist (Appendix).



Photo: 13 Two chain of custody seals attached to boat and trailer



Photo: 14 Chain of custody seal attached to boat and trailer

Launching on Quabbin Reservoir

On Saturday, August 8, 2009, all 21 boats processed through the inspection/decontamination program arrived at Boat Launch Area 1 - Quabbin Reservoir for the 2009 Special Olympics with their inspection/decontamination seals intact. DCR staff recorded the serial numbers on each tag and then removed the seal before the boats were allowed to launch. When the boats departed Quabbin Reservoir at the Boat Launch Area at the end of the day, DCR staff attached new seals to the boat/trailer. DCR staff replaced seals on all original 21 boats.

Conclusion

The inspection, decontamination and sealing of the private boats during the Pilot Program is a quantum leap forward in protection of the Quabbin Reservoir from aquatic invasive species. DCR and MWRA staff are confident in the ability of this program to provide a high degree of protection from not only zebra mussels, but from all aquatic invasive species. The Pilot Program was also highly successful as an education tool. In general, the inspection/decontamination process could be completed on a typical boat in about 30 minutes – a reasonable amount of time. The major findings of the Pilot Program are:

- The inspection program found no invasive species on boats or trailers;
- Decontamination, utilizing high temperature (140° F) washing is practical and effective;
- Sealing or tagging the decontaminated boats using serial numbered tags is feasible and worked well for the Special Olympics event.

The Pilot Program used significantly more staff than a more established program would need. It took time to develop procedures, determine what to look for and how to get the hot water into the places it was needed. Once a system was established, a boat could make its way through the process in 20 to 30 minutes. The overtime labor cost for DCR/MWRA to do 21 boats was approximately \$2,100. MWRA had staff operating exiting MWRA pressure washers and paid for pumping the Massachusetts Highway tight tank at a cost of approximately \$500.

In addition, an underwater camera performed an inspection of Shaft 12 (the intake structure for Quabbin water transferring east to the Wachusett Reservoir) and divers performed an inspection of the boat ramp areas. No zebra mussels were found.

A special sampling program, utilizing netting and microscopic analysis found no zebra mussel larva in Quabbin. Additional water sampling was also performed to verify pH, hardness and calcium levels (limiting factors for zebra mussel growth) in Quabbin water.

Next Steps

Based upon the experiences gained during the Pilot Program DCR/MWRA staff recommend to the DRC Commissioner and the MWRA Board of Directors that an expanded inspection, decontamination and sealing program be implemented now. As previously stated, staff believe this program has provided a new and highly effective level of protection against aquatic invasive species for the Quabbin Reservoir.

Staff believe that an expanded program can proceed immediately to protect the Quabbin and allow private boating for the remainder of this season. The 45-day closure period was based upon the desire to provide immediate protection to the Quabbin and the authority of the DCR Commissioner and not based upon a set scientific time period. Since this prohibition has been put into place, an effective program to provide protection against aquatic invasive species has been developed based upon successful programs elsewhere in the United States and field tested with the Pilot Program. Staff believe implementing the Pilot Program procedures now rather than continuing the prohibition period will provide protection to the Quabbin Reservoir.

If approved, the expanded program may continue the DCR/MWRA pilot program at the Mass Highway Garage in Belchertown. Using the lessons learned from this pilot, changes to the inspection checklist and cleaning procedures will be made. All motors will be flushed and all live wells will be flushed with hot water.

DCR has also developed a Request for Response to local car washes to set up contracts to establish official DCR/MWRA boat wash stations. If an expanded program is approved by the Commissioner of DCR and the MWRA Board and a contract(s) for car wash

site(s) is executed, DCR would continue to provide inspection of the boats and trailers and oversee the high temperature decontamination, and the sealing of the boat to the trailer. All procedures and checklists from the pilot program would continue as modified based on lessons learned. DCR staff would set up a schedule for boat wash stations and have boat owners call the Quabbin Visitors Center to make appointments.

A quote has been received from a commercial car wash for about \$30 per wash. DCR would have a Ranger and Environmental Quality staff present to collect information, inspect and verify that boats are cleaned in accordance with the DCR procedures and attach the seal. There are a number of variables in predicting the cost of the boat cleaning program for the remainder of this season. DCR staff estimate \$50 to \$75 per boat including the car wash costs and salary for a Ranger and Environmental staff. There is the possibility that there are hundreds of boats that may want to participate this season. DCR sold 625 season passes this year and there are an estimated 300 to 400 other boats that use Quabbin. It is late in the season so that may reduce the number of people willing to go through the process of scheduling and spending time getting their boat cleaned. The boat cleaning program will also put a burden on the rest of the DCR staff and this will have some impact on other watershed programs.

At the end of the current season, boats can be sealed by DCR as "Quabbin Only." If the seals are unbroken in the Spring the boats could be allowed onto Quabbin without an initial disinfection since any aquatic species would not survive out of water for the entire winter season. Any boat not sealed would be required to undergo the inspection, disinfection and sealing process.

Quality Assurance/Quality Control

A thorough quality assurance/quality control component is essential for a successful inspection, decontamination, and sealing program. If the program is continued at the Mass Highway facility in Belchertown (depending upon availability) DCR and MWRA staff will continue to perform all inspection, decontamination and sealing tasks. All staff involved are/will be trained by the DCR Aquatic Biologist on checklists and techniques. The DCR Aquatic Biologist will also audit the process.

If a commercial wash facility is utilized, DCR staff will remain extensively involved and continue to perform important roles. DCR staff (Environmental Analysts trained by the DCR Aquatic Biologist) will continue to perform the inspection of the boats. These inspections will be based upon written procedures/checklists already developed and modified based upon lessons learned. The DCR Environmental Analyst will also oversee the high temperature washing of the boat and trailer by the commercial facility to ensure that approved procedures and minimum temperature are met. The Environmental Analyst will also perform the sealing of the boat and record all information. The DCR Aquatic Biologist will perform audit checks of the program. In addition, MWRA staff will also perform QA/QC audit checks. A DCR Park Ranger will also be on-site during washing to ensure an orderly process. No boat will receive a seal unless all requirements of the program have been met and documented

Ongoing Activities

Over the winter, DCR and MWRA will continue to develop and refine procedures for a long term monitoring and control program for invasive species. The current program of plankton trawls in the reservoir to determine if there are any zebra mussel veligers and spiny water flea in the water column will continue thought the fall and next year and will be monitored. A long term program of visual inspection of the reservoir and intake facilities for evidence of any invasive species will be developed. The locations, administrative logistics, and financing procedures of a long term boat inspection and sanitizing program will also be developed between now and the opening of the fishing season in spring 2010. Considerations will need to include how to handle boats which are sanitized at the beginning of the season, and are then used elsewhere, and whether initial and subsequent inspection and sanitizing have a different cost. Finally, MWRA and DCR will scope out and begin implementation of a site specific research program capable to providing additional information about the relative suitability of Quabbin water characteristics for the reproduction and growth of zebra and/or quagga mussels. This will probably involve collaboration with a university research team and a bench scale simulated reservoir using actual Quabbin water and mussels imported from an infected water body. The work would need to be carefully conducted off the watershed

to eliminate any risk of inadvertently introducing the mussels into any uninfected water bodies.					
OULICS.					

Appendix

Survey Results

- 42.8% Quabbin only boaters
- 57.1% Other than "Quabbin only" boaters
- 11 of 12 "Other than Quabbin" boaters have gone somewhere else after Quabbin had closed, but before boat inspection
- 1 of 12 "other than Quabbin" had not been anywhere since Quabbin was closed.
- 3 of 21 only use trolling, or trolling with downriggers
- 3 of 21 only conduct anchor and still fishing
- 6 of 21 do both trolling and still fishing
- 18 of 21 use live bait
- 7-8 of that use live bait fish get it near Gate 8 Martells
- 3-4 get it from R&R
- 3 get live bait from Flaggs in Orange
- 2-3 catch their own live bait
- 3 of 21 do not use live bait at all
- 100% have season passes
- 100% list Quabbin as primary boat location
- 14 of 21 go to Quabbin 20-50 times/season (~1/2 times/week)
- 2 of 21 go 90 times/season (4 times/week)
- 5 of 21 go between (3-12 season)

Survey Comments

Concerns

- 1. Has not seen definitive proof that zebra mussels can grow in the Quabbin, so thinks program might be unnecessary.
 - a. Would like to see if fishermen can clean their boats themselves.
 - b. Program might be an issue if people have to pay more money when they come back, due to the decontaminations.
- 2. Believes the process should be easier for guys who want to take their boats elsewhere.
 - a. Most fishermen using trolling with down riggers live close to the Quabbin and are retired, so they might not have a problem with the program, but fishermen using non-trolling methods might like to take their kids fishing elsewhere.
- 3. Is concerned that the hot water will melt the boat's plumbing (bilge pump etc).
 - a. Also thinks that starting program now is ridiculous, because he knows fishermen that have been coming to Quabbin after boating in Ontario for 20 years, and there has not been an infestation of zebra mussel in Quabbin.
- 4. Thinks the program is unnecessary.
- 5. Is concerned he won't be able to flip his boat upside down during the winter with the seal attached.
 - a. Would like to know if seal can be used at all Quabbin gates and if there will be a system or list to accommodate fishermen moving around between gates.
 - b. Also does not believe zebra mussels can grow in Quabbin and would like a full test to be implemented to see if a colony could establish itself and grow.
- 6. Thinks a shiny boat will decrease his catch rate
 - a. Hot water is bad for the boat's plumbing.
- 7. Hot water will ruin boat's plumbing and stickers/decals
 - a. The programs costs might increase, and thinks there will be a lack of control of prices charged by the car washes for the decontamination.
- 8. Owns an expensive boat, wants us to be careful during decontamination.

Support

- 1. Believes that DCR employees will clean his boat very well.
- 2. Believes the program is a good idea and that it is protecting the interests of the fishermen.
- 3. The decontamination only uses hot water, so is not concerned with the cleaning.
- 4. Hopes the process will work so that he can get back on the water in his boat.
- 5. Believes that decontamination will not hurt his boat, and is fine with the process as long as DCR lets him fish afterwards.

Inspection #

Boat Inspection Survey

Department of Conservation and Recreation Quabbin Reservoir Vessel Survey

Own	er/Operator:
Towi	n, State of residence:
All s	urvey questions pertain to the boat being inspected and decontaminated
1.	Primary boating location:
	a. Number of times in the past year:
2.	Date of last Quabbin visit:
	a. Number of times at Quabbin Reservoir in the past year:
3.	Other boating locations and number of times you went boating at each in the past
y	ear:
4.	Use trolling Motor (circle): YES NO
	a. If yes, how often?
5.	Use live Bait (circle): YES NO
	 a. If yes, were do you buy it (check box)? □ Gate 8 □ R&R □ Flaggs □ Other
	Primary fishing method (check box): ☐ Trolling with down riggers ☐ Trolling ☐ Anchoring and still fishing ☐ All methods

Inspection	#	

Boat Inspection Checklist

Department of Conservation and Recreation Quabbin Reservoir Vessel Inspection, Education, Decontamination Checklist

Owner/Oper	rator (Print N	Name):	
Boat make			Motor make and HP
Boat Regist	tration #		Phone #
Season Pass	#		Email:
Date:			
□ Complete	Vessel Surv	zev Form	
□ Information		•	
		_	compartments and have the bilge plug pulled.
			inform owner boats with leaks will not be allowed on
Quabbin.	at 101 OII aiic	i gas icaks	illiotili owilci boats with leaks will not be allowed on
•	un an/an anata	m that Owal	shin has a no talamanaa naliay fan any dahmis an amayyth
	-	_	bbin has a no tolerance policy for any debris or growth
	y vessei due	to possible	e transportation of invasive species by vessels and
trailers.			
Vessel Inspe	ection Deco	ntamination	n: Inspect vessel for WATER , DEBRIS or
			with 140° F high pressure water.
	una cream an	ii ballaces	with 110 1 mgn pressure water.
Check appro	priate box b	below to in-	dicate it has been inspected and power washed.
<u>Inspection</u>	-	econtamin	1 1
Dry/Clean	Wet		
			Tow Vehicle hitch area
			Trailer structure, railings, spare tire
			Vessel hull
			Through hull fittings
			Transom
			Motor –prop, shafts and all water contact areas
			Outside motor
			Trim tabs
			Transducers
			Bilge plug pulled – no fluid or debris
			Bait tank/live wells/compartments
			Bilge (if dry and clean do not power wash)
			Anchor/fenders and line
			Trolling Motor
			Down riggers
			Flush Motor
			Interior
			m owner that tampering with seal will result in
	a perma	inent ban c	on use at Quabbin Reservoir.
	Pass		
	Fail		
	Seal #		Inspector name